UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
Southwest Region
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MAY 2 8 2004

MEMORANDUM FOR: Scientific Research Permit No. 1431, SWR-03-SA-8854:HLB

FROM: Rodney R. McInnis
Acting Regional Administrator

SUBJECT: Addendum to the Central Valley Programmatic Biological Opinion for Scientific Research; Lower Feather River Fishery Studies

I. CONSULTATION HISTORY

Section 10(a)(1)(A) of the Endangered Species Act of 1973, as amended, (ESA) provides the National Marine Fisheries Service (NOAA Fisheries) with authority to grant exceptions to the ESA's "taking" prohibitions for scientific research (see regulations at 50 CFR 222.301 through 222.308, and 50 CFR 224.101 through 224.102). Scientific research or enhancement permits may be issued to Federal or non-Federal entities conducting research or enhancement activities that involve take of ESA-listed endangered or threatened species. Any permitted research or enhancement activities must: (1) be applied for in good faith, (2) if granted and exercised, not operate to the disadvantage of the endangered species, and (3) be consistent with the purposes and policy set forth in section 2 of the ESA (50 CFR 222.303(f)). NOAA Fisheries prepared this addendum to the Central Valley Programmatic Biological Opinion for Scientific Research (Central Valley Research Opinion; NOAA Fisheries 2003a) in compliance with section 7(a)(2) of the ESA (16 U.S.C. 1536).

On March 13, 2003, the California Department of Water Resources (DWR) submitted an application for a research permit to take federally-listed threatened Central Valley spring-run Chinook salmon (*Oncorhynchus tshawytscha*), and threatened Central Valley steelhead *(O. my kiss)* pursuant to section 10(a)(1)(A) of the ESA, for the Lower Feather River Fishery Studies. NOAA Fisheries published a notice of receipt of DWR's permit application in the Federal Register on April 17, 2003 (68 FR 18951), announcing the beginning of a 30-day public comment period. No public comments were received. A complete administrative record for this consultation is on file at the NOAA Fisheries Sacramento Area Office, 650 Capitol Mall, Suite 8-300, Sacramento, California 95814.

II. DESCRIPTION OF THE PROPOSED ACTION

Under the authority of section 10(a)(1)(A) of the ESA, NOAA Fisheries proposes to issue a five-year research permit *(i.e.,* Scientific Research Permit No. 1431 [Permit 1431]) to DWR authorizing take of adult and juvenile Central Valley spring-run Chinook salmon, and Central

Valley steelhead for the Lower Feather River Fishery Studies. The permit would be in effect for five years from the date of issuance, and would be subject to the limitations of the ESA and the regulations in 50 CFR parts 222, 223, and 224, for the period stated on the permit unless it is modified, suspended, or revoked sooner.

A. Research Project Description

The studies proposed by DWR are part of the process of renewing the Federal Energy Regulatory Commission (FERC) hydropower generation license for the Oroville-Thermalito Facilities. The overall goal of the studies is to evaluate potential effects of ongoing operations of the Oroville-Thermalito Facilities on Chinook salmon, steelhead, and their habitat in the lower Feather River, below the Feather River Fish Barrier Dam. The proposed study elements include project activities designed to help determine and evaluate:

1. Spring-run Chinook salmon holding and spawning status
2. Chinook salmon spawning escapement surveys; and
3. Growth, movement, and life history of steelhead trout

B. Project Activities

1. Spring-run Chinook Salmon Holding and Spawning Status

Beginning in April 2004, up to 55 adult Chinook salmon will be captured each year and up to 30 of them will be fitted with radio tags to track their migration, holding, and spawning behavior. The primary method used to catch fish will be by angling above the confluence of the Feather and Yuba Rivers. Angling will occur for one week each month from April through June. As a secondary sampling technique, DWR will deploy a fyke trap with a 10-foot diameter mouth at Star Bend, near river (RM) mile 17. The fyke trap will be deployed during the same time period as the angling and checked daily. At least 50 percent of the tagged population will be female. If 30 adult Chinook salmon have not been tagged by the end of June, one additional week of angling will occur in July in an attempt to tag 30 fish.

Captured salmon will be placed in a 485-liter tank filled with river water. The water will be treated with NovAqua® water conditioner and aerated with commercial grade oxygen to saturation. For tagging, salmon will be removed from the aerated tank and a shrink-wrapped radio tag and temperature sensor will be inserted into their esophagus. After tagging, the fish will be placed in a super-oxygenated water tank, monitored until full recovery, and released just upstream of the point of capture. Injured or unhealthy fish will not be anesthetized or tagged, and will be released upstream from the capture location.

A combination of mobile and fixed-station receivers and data loggers will be used to track and monitor the location of radio-tagged salmon. The California Department of Fish and Game (DFG) air services will conduct mobile radio tracking by plane, and DWR fisheries staff will

conduct mobile radio tracking by boat. Aerial radio tracking will continue to the end of July and boat tracking will continue until all radio-tagged fish have spawned or died. Fixed radio tracking receivers will be located at Verona (RM 0), Shanghai Bend (RM 24.7), the mouth of the Yuba River (RM 28), Sunset Pumps (RM 38.6), Thermalito Outlet (RM 59), and above Robinson Riffle (RM 61.7). Radio tracking data will periodically be downloaded from the fixed monitoring receivers for processing. Water temperature sensors will be recovered from dead fish during carcass surveys or using other manual tracking methods. Upon recovery of the sensors, water temperature data will be downloaded for processing.

2. Chinook Salmon Spawning Escapement

Annual carcass surveys will begin in 2004 to determine Chinook salmon spawning escapement. The surveys will be conducted between the Feather River Fish Barrier Dam and Gridley, and will occur weekly from September through December. The surveys will result in the collection of spring-run Chinook salmon carcasses.

The surveys will be conducted by six to nine crew members working from two to three boats. The survey area will be stratified into 40 sections, each comprised of one pool/riffle sequence. Throughout the survey period, each section will be surveyed weekly, and all fresh carcasses will be counted and tagged with a colored batch tag inserted into the lower jaw. Fresh carcasses are defined as having either one clear eye or pink gills. Carcasses that are not fresh will be counted and chopped in half to avoid counting them in subsequent surveys. Chopped carcasses will be returned to the river. All fresh female carcasses will be visually inspected for spawning status and classified into one of three categories (*i.e.*, not spawned, partially spawned, or fully spawned). All observed carcasses will be inspected for presence of tags from previous surveys. If a tag is found, the data will be recorded and the carcass will be chopped in half and returned to the river.

Along with inspecting carcasses for carcass survey tags, carcasses will be inspected for adipose fin clips. The head from adipose-clipped carcasses will be removed and labeled with head tags provided by DFG. Scales, otolith and tissue samples will be collected from no more than 500 carcasses that will be randomly selected from all survey sections. These samples will be collected, labeled, and stored following DFG collection protocols. Otoliths will be retained by DWR until analyses can be completed, and then will be archived by DFG.

3. Growth, Movement, and Life History of Steelhead

These surveys will involve capturing and marking juvenile steelhead, and collecting scale and otolith samples from adult steelhead. Juvenile steelhead will be collected using backpack-mounted electrofishing equipment and seines with block nets. Sampling will occur at four locations in the low flow channel of the Feather River on a biweekly basis. Sampling sites will include Hatchery Riffle, Bedrock Riffle, Robinson Riffle, and Steep Riffle. All captured steelhead will be placed in shaded, five-gallon buckets. Water in the buckets will be exchanged at intervals necessary to maintain cool water temperatures and high levels of dissolved oxygen.

Prior to handling, individual steelhead will be anesthetized in a standardized solution of tricaine methanesulfonate (MS-222). Once an individual has been immobilized in the MS-222, it will be quickly weighed and measured. Each individual will receive a unique color-coded mark using a visible implant flourescent elastomer tag. After steelhead are measured and marked, they will be placed in a shaded recovery bucket containing fresh river water. Once fish have fully recovered, they will released into the river at the approximate location of capture. Recaptures of steelhead during subsequent surveys will be recorded by tag code description.

Scale and otolith samples will be collected from adult steelhead during winter months *(i.e.,* October through May). Scale samples will be taken by accompanying anglers and collecting scales from angler caught steelhead. Anesthetic will not be used because most steelhead can be immobilized in a fishing net without injury, while scales are taken. No more than 105 individuals will be sampled for scales each year. Otoliths will be collected from naturally-occurring steelhead carcasses. Up to 10 otoliths will be collected from carcasses each year. Scales and otoliths will collected and archived following DFG protocols.

C. Description of the Action Area

The action area is defined as all areas to be affected directly or indirectly by the Federal action and not merely the immediate area involved in the action (50 CFR § 402.02). The action area includes the entire Lower Feather River from the Feather River Fish Barrier Dam, downstream to the confluence with the Sacramento River. This area is selected because it encompasses the entire study area.

D. Requested Amount of Take

DWR anticipates both lethal and nonlethal take of Central Valley spring-run Chinook salmon and Central Valley steelhead. All lethal take will be unintentional. A detailed summary of the requested amount, type, and timing of take is listed in Table 1 (attached). A narrative description of the amount of take anticipated from each study element follows.

1. Spring-run Chinook Salmon Holding and Spawning Status

The study element is expected to result in an annual estimated nonlethal capture and handling of up to 50 adult spring-run Chinook salmon. Up to 30 of these fish will be radio tagged each year. An additional lethal take of five adult spring-run Chinook salmon *(i.e.,* up to 10 percent of those captured) is expected from fish that die during capture, handling, or tagging.

2. Chinook Salmon Spawning Escapement

DWR anticipates handling, marking, and recapturing up to 40,000 Chinook salmon carcasses annually. DWR identifies these 40,000 fish as spring-run Chinook salmon, but notes that at the time of the survey, it is not possible to distinguish between spring-and fall-run Chinook salmon in the Feather River. Because of this, the requested amount may include a substantial component

of non-listed Central Valley fall-run Chinook salmon *(O. tshawytscha)*. Up to 500 spring-run Chinook salmon carcasses will be collected annually for scale, otolith, and tissue collection. A large component of these 500 fish also are expected to be fall-run Chinook salmon.

3. Growth, Movement, and Life History of Steelhead

The project may result in the annual capture and nonlethal take of up to 100 adult steelhead for scale collection, and an annual lethal take of up to 5 adult steelhead (*i.e.*, 5 percent of those captured) that die as a result of capture and handling. Up to 10 adult steelhead carcasses may be collected for otolith retrievals. The project may also result in the annual capture, tagging, and release of up to 750 juvenile steelhead, and an annual estimated lethal take of up to 25 juvenile steelhead *(i.e.,* 3.3 percent of those captured) that die as a result of capture and tagging.

E. Measures Proposed by DWR to Reduce the Impacts of Issuing Permit 1431

Research activities authorized under Permit 1431 potentially will result in lethal and nonlethal take of adult and juvenile Central Valley spring-run Chinook salmon, and Central Valley steelhead. Following are measures proposed by DWR that will be implemented to minimize adverse impacts on these salmonids during the research activities:

1. To minimize the adverse impacts associated with determining the holding and spawning status of spring-run Chinook salmon, sampling techniques related to this study element will only be employed when water temperatures are below 20 °C. In the event that capturing, trapping, or tagging activities causes any Chinook salmon to die, DWR will suspend sampling and contact NOAA Fisheries before resuming the project. Captured fish that are injured or unhealthy will not be tagged. The fyke trap will be checked daily during the sampling period.

2. To avoid or minimize adverse impacts associated with Chinook salmon spawning surveys, only dead fish will be collected, and processed carcasses will be returned to the river. Only the heads of adipose fin-clipped fish will be kept.

3. To avoid or minimize adverse impacts associated with steelhead growth, movement, and life history studies, electrofishing will be supervised by DWR staff who have completed the U.S. Fish and Wildlife Service electrofishing training course. Sampling will follow the NOAA Fisheries electrofishing guidelines (Appendix A of the Central Valley Research Opinion) and will only occur when water temperatures are below 18 °C.

F. Measures Required by NOAA Fisheries to Reduce the Impacts of Issuing Permit 1431

1. NOAA Fisheries has reviewed the credentials of the principal investigators for the proposed research. All investigators are well qualified and have provided evidence of experience working with salmonids or the concepts outlined in the proposed projects.

2. NOAA Fisheries has developed nondiscretionary conditions for Permit 1431 that are necessary and appropriate to minimize take of listed salmonids, as described in the permit and Appendices A and B of the Central Valley Research Opinion. The investigators will ensure that all persons operating under Permit 1431 will be familiar with the terms and conditions therein.

3. NOAA Fisheries will monitor project activities to ensure that the project is operating satisfactorily in accordance with Permit 1431. NOAA Fisheries will monitor actual annual take of ESA-listed fish species associated with the proposed research activities (as provided in annual reports or by other means) and will adjust annual permitted take levels if they are deemed to be excessive or if cumulative take levels are determined to operate to the disadvantage of the salmonids.

4. All persons operating under Permit 1431 will be properly trained and have access to properly maintained state-of-the-art equipment.

5. All salmonids captured and not lethally taken will be processed immediately and then released.

III. STATUS OF THE SPECIES AND CRITICAL HABITAT

The issuance of Permit 1431 potentially may affect Central Valley spring-run Chinook salmon, and Central Valley steelhead. The recently issued Central Valley Research Opinion describes the status of the Central Valley spring-run Chinook salmon and Central Valley steelhead ESUs. The current status of listed salmonids in the Central Valley, based on their risk of extinction, has not significantly improved since the species were listed (NOAA Fisheries 2003a).

Central Valley spring-run Chinook salmon have displayed broad fluctuations in abundance over time. Their numbers have ranged from lows of approximately 400 in 1966 and 3,000 in 1992 to highs of approximately 38,000 in 1982 and 34,000 in 1998, and recently number nearly 13,000 in 2002 (DFG 1998, 2004). Central Valley steelhead declined from an average of approximately 11,000 adult fish in the late 1960s and 1970s, to approximately 2,000 fish through the early 1990s (McEwan 2001). Recent estimates from trawling data in the San Francisco-San Joaquin Delta suggest that over 3,600 female steelhead spawn in the Central Valley basin (NOAA Fisheries 2003b).

As discussed in the Central Valley Research Opinion, factors affecting Central Valley spring-run Chinook salmon and Central Valley steelhead include: (1) dam construction that blocks previously accessible habitat; (2) water development activities that affect water quantity, water quality, and hydrographs; (3) land use activities such as agriculture, flood control, urban development, mining, and logging; (4) hatchery operation and practices; (5) harvest activities; (6) ecosystem restoration actions; (7) natural conditions; and (8) scientific research. Large darns are present on almost every major tributary to the Sacramento River, and block access to the upper

portions of watersheds that represent approximately 80 percent of historical habitat. Water diversions directly entrain fish, and can affect habitat for example by reducing wetted area and causing water temperatures to increase. Runoff from agricultural, urban, and other sources contains pollutants and suspended sediment, which affects water quality. Hatchery fish can compromise the genetic integrity of wild stocks, and fishing pressure on wild stocks can increase during years of high hatchery production. Habitat restoration projects can temporarily cause disturbance and increased suspended sediment in waterways, but ultimately may increase habitat abundance and complexity, stabilize channels and streambanks, increase spawning gravels, decrease sedimentation, and increase shade and cover for salmonids. Cycles in ocean productivity and drought conditions can have corresponding effects on salmonid life history parameters such as growth, recruitment, and mortality. Scientific research can lead to harm, harassment, and death of listed salmonids, but generally is thought to affect only a small number of fish in this manner. The knowledge gained from scientific research may lead to improved management of listed ESUs, increased population sizes, and consequently increased likelihood of survival and recovery.

Critical habitat is not designated for Central Valley steelhead or Central Valley spring-run Chinook salmon, and the research activities described in this document will not result in any changes or effects to salmonid habitat. Therefore, NOAA Fisheries will not discuss critical habitat further in this document.

IV. ENVIRONMENTAL BASELINE

The environmental baseline includes the past and present impacts of all Federal, State, or private actions and other human activities in the action area, the anticipated impacts of all proposed Federal projects in the action area that have already undergone formal or early section 7 consultation, and the impact of State or private actions which are contemporaneous with the consultation in process (50 CFR §402.02). A detailed discussion of the factors affecting the species in each Evolutionarily Significant Unit (ESU) is provided in the Central Valley Research Opinion.

A. Status of the Species in the Action Area

The action area contains naturally-spawning and hatchery-produced Central Valley spring-run Chinook salmon and Central Valley steelhead which comprise the entire Feather River populations of these species, and provides migration, holding, spawning, and rearing habitat. Following is a status summary of these species and their habitat within the action area.

1. Central Valley Spring-run Chinook Salmon

The number of naturally-spawning spring-run Chinook salmon in the Feather River has been estimated only periodically since the 1960s, with estimates ranging from 2 fish in 1978 to 2,908 in 1964. Adult spring-run Chinook salmon that return to the Feather River Fish Hatchery have

been counted each year since 1963, and their numbers have ranged from 146 in 1967 to 8,662 in 2003 (DFG 2004). The majority of in-river spring-run Chinook salmon spawning is concentrated in the uppermost three miles of accessible habitat in the Feather River below the Feather River Fish Hatchery (DWR 2001). The genetic integrity of this population is at question because there is significant temporal and spatial overlap between spawning populations of spring- and fall-run Chinook salmon (NOAA Fisheries 2003b).

Based on observations of spring-run Chinook salmon immigration in the Sacramento River, adults are likely to migrate upstream through the action area during the period between February and July where they hold in deep coldwater pools until spawning begins in mid- to late August. Most pre-spawning spring-run Chinook salmon adults hold in the upper three miles of the low flow channel (BOR 2004). Cooler temperatures near the upper end of the low flow channel during the summer provide suitable holding conditions throughout the summer months and provide the coldest water available during September for the initiation of spawning. For spring-run Chinook salmon, spawning primarily occurs during September and emergence of fry from redds is predicted for December and January. Results from Feather River Chinook salmon emigration studies indicate virtually all spring-run Chinook juveniles in the Feather River exit as sub-yearlings. Emigration of young-of-year begins immediately following emergence in late November, peaks in January or February, and continues through June (DWR 1999a,b,c).

2. Central Valley Steelhead

Limited information exists regarding the abundance, location, and timing of steelhead spawning within the Feather River. The only reliable information available on in-river adult abundance since the construction of Oroville Dam is from steelhead redd surveys conducted by DWR in 2003 (DWR 2003). Based on these surveys, DWR estimated that a minimum of 163 steelhead spawned in the Feather River in 2003. Nearly half *(i.e.,* 48 percent) of all redds were located in the uppermost mile of existing anadromous habitat below the Feather River Fish Barrier Dam. The Feather River Fish Hatchery maintains records of the number of steelhead that have entered the hatchery annually since 1967. Feather River Fish Hatchery counts since 1969 ranged from a low of 78 to a high of 2,587, with an average of 904 adults per year (DWR 2001).

Steelhead adults migrate upstream in the Sacramento River during the period between December and March to spawn and are likely to enter into the Feather River during the same period. Most steelhead return to the Feather River Fish Hatchery and very limited information exists regarding their location, timing, and magnitude of spawning within the river. Observations to date suggest that the low flow channel is the primary reach for steelhead spawning, with up to 75 percent of the spawning occurring in the side channel adjacent to the Feather River Fish Hatchery (DWR 2003).

Chinook salmon emigration studies in the Feather River from 1995 through 1998 have incidentally captured steelhead young-of-year and yearlings. Young-of-year were captured from March through June, while yearlings were captured January through June. Steelhead were not captured during the period between October and December, but researchers speculated that this

may have occurred because the sampling gear may not be able to detect their presence during this time (DWR 1999a,b,c). Based on these results and steelhead emigration patterns in the Sacramento River, steelhead juveniles and smolts are expected to emigrate from the Feather River to the lower Sacramento River and Delta from December through March.

B. Factors Affecting the Species in the Action Area

The Central Valley Research Opinion describes the ongoing activities and historical events that have affected listed salmonids in the Central Valley. In particular, two activities described in the Central Valley Research Opinion, water diversion projects in the Sacramento-San Joaquin Delta and hatchery operations in the Feather River, have the largest potential impacts to the populations of listed salmonids in the action area. Namely, operation of the State Water Project's Oroville Facility alters historical flow patterns that affect the timing of juvenile outmigration and direction of adult upstream migration of salmonids. Secondly, the large numbers of fish released from the Feather River Fish Hatchery can pose a threat to wild salmonids through genetic impacts such as inbreeding, and increased competition, predation, and fishing pressure that result from hatchery production. Additionally, the Feather River Fish Barrier Dam interrupts the upstream migration of spring- and fall-run Chinook salmon in the Feather River, forcing both in-river populations to occupy and utilize the same holding and spawning habitat. This is thought to contribute to significant spatial and temporal overlap of spring- and fall-run Chinook salmon spawning in the Feather River that is likely to have led to the homogenization of the races over time (DWR 2001, NOAA Fisheries 2003).

V. EFFECTS OF THE PROPOSED ACTION

Pursuant to Section 7(a)(2) of the ESA (16 U.S.C. §1536), Federal agencies are directed to ensure that their activities are not likely to jeopardize the continued existence of any listed species or result in the destruction or adverse modification of critical habitat. This biological opinion tiers to the Central Valley Research Opinion and assesses the effects of issuing Permit 1431 on Central Valley spring-run Chinook salmon and Central Valley steelhead. The Feather River Fishery Studies are likely to take federally-listed spring-run Chinook salmon and steelhead through capturing, handling, injuring, and killing individuals during implementation of each study element.

Regulations that implement section 7(b)(2) of the ESA require biological opinions to evaluate the direct and indirect effects of Federal actions and actions that are interrelated with or interdependent to the Federal action to determine if it would be reasonable to expect them to appreciably reduce listed species' likelihood of surviving and recovering in the wild by reducing their reproduction, numbers, or distribution (16 U.S.C. §1536; 50 CFR § 402.02). Section 7 of the ESA and its implementing regulations also require biological opinions to determine if Federal actions would appreciably diminish the value of critical habitat for the survival and recovery of listed species (16 U.S.C. §1536).

A. Project Specific Effects

1. Spring-run Chinook Salmon Holding and Spawning Status

This study element will result in the capture, handling, and potential harm or killing of adult Central Valley spring-run Chinook salmon. Adult salmon will be captured and handled using hook-and-line techniques or a fyke trap. Some fish may be unintentionally harmed or killed as a result of being captured or tagged with radio transmitters and temperature sensors. Sampling protocols, and capture and handling procedures described in section II *(Description of the Proposed Action)* will minimize the stress and mortality of captured fish. Adherence to these procedures is expected to keep capture and handling mortalities below 10 percent of the total number of fish captured. The remaining fish that are tagged and released are expected to successfully continue their upstream migration, oversummer, and spawn.

The requested amount of take for Central Valley spring-run Chinook salmon is not expected to result in a significant effect at the scale of the ESU because the anticipated mortality rates are low, and both the capture and mortality levels are low relative to the overall abundance of the species. Since 1993, the adult Central Valley spring-run Chinook salmon population estimate has ranged between 6,075 and 31,471 fish (DFG 2004). By comparison, the total annual nonlethal take of adult spring-run Chinook salmon *(i.e,* 50 adults) represents between 0.8 and 0.2 percent of the overall ESU abundance estimate, and the amount of lethal take *(i.e., 5* adults) represents between 0.08 and 0.02 percent.

2. Chinook Salmon Spawning Escapement

This study element will result in the handling, and collection of adult Central Valley spring-run Chinook salmon carcasses. Salmon carcasses will be collected from the Feather River and handled during tagging and processing. In general, carcasses will be returned to the river, but the heads of carcasses with adipose fin-clips will be collected and stored for coded-wire tag extraction.

Because this study element will involve only handling and collecting carcasses, and most of these carcasses will be returned to the river once they have been processed, the take associated with this study element is expected to have no adverse effect on the live fish and no effect on the species ability to survive and reproduce. Furthermore, since spring- and fall-run Chinook salmon spawning overlaps both temporally and spatially in the Feather River, and it is not currently possible to distinguish between the two species, the total amount of take requested for this study element actually is comprised of a significant, although unknown amount of fall-run Chinook salmon. Because of these factors, the collection of spring-run Chinook salmon carcasses is not expected to have a significant effect on the ESU.

Growth, Movement, and Life History of Steelhead Trout

This study element will result in the capture, handling, and potential harm or killing of juvenile Central Valley steelhead. Steelhead will be captured and may be injured or killed using backpack mounted electrofishing equipment, beach seines, and hook-and-line techniques. Juvenile steelhead will be handled and may be unintentionally injured or killed during anesthetization, tagging, and scale removal. Steelhead carcasses will be collected for otolith and scale extraction.

The requested amount of take for Central Valley steelhead is not expected to result in a significant effect at the scale of the ESU because the anticipated mortality rates are low, and most steelhead caught are expected to be hatchery fish. Hatchery-produced steelhead are not protected by the ESA, although they are likely to comprise a significant component of the number of fish caught during this study. Since 1998, all juvenile hatchery steelhead have been adipose fin-clipped. NOAA Fisheries (2003b) evaluated post-1998 midwater trawl catch data from below the confluence of the Sacramento and San Joaquin Rivers at Chipps Island to estimate the ratio of wild to hatchery-produced Central Valley steelhead. Based on these catch data, NOAA Fisheries estimated that hatchery-produced Central Valley steelhead comprised between 70 and 94 percent, and averaged 85 percent of the total Central Valley steelhead population.

B. Beneficial Effects

DWR is in the process of renewing its FERC license for the Oroville-Thermalito Facilities. The existing license expires in 2007, and DWR must apply for a new license by January 2005, to operate the project for another 30 to 50 years. The proposed studies have been identified during the relicensing process to evaluate the effect of the Oroville-Thermalito Facilities on federally-listed anadromous salmonids and their habitat in the Lower Feather River. Results of these studies will contribute to the development of protection, mitigation and enhancement measures for anadromous fish and their habitat, that may be part of the new license.

VI. CUMULATIVE EFFECTS

Cumulative effects are defined in 50 CFR §402.02 as "those effects of future State or private activities, not involving Federal activities, that are reasonably certain to occur within the action area of the Federal action subject to consultation." Future Federal actions, including the ongoing operation of hatcheries, water diversions, and some land management activities, will be reviewed through separate section 7 consultation processes and not considered here. Similarly, non-Federal actions that require authorization under section 10 will be evaluated in separate section 7 consultations and not considered here. A general summary of potential cumulative effects that may affect Sacramento River winter-run Chinook salmon, Central Valley spring-run Chinook salmon, and Central Valley steelhead within the action area is described in the Central Valley Research Opinion. These include ongoing agricultural and urban activities that likely will continue to affect stormwater runoff patterns and water quality in the action area, and future

population growth that will result in new urban development and increased disturbance of waterways and riparian areas, as well as stormwater and water quality impacts.

VII. CONCLUSION

After reviewing the best available scientific and commercial data, the current status of Central Valley spring-run Chinook salmon, and Central Valley steelhead, the environmental baseline for the action area, the effects of the proposed issuance of Permit 1431, and the cumulative effects, it is NOAA Fisheries' biological opinion that the issuance of Permit 1431, as proposed, is not likely to jeopardize the continued existence of Central Valley spring-run Chinook salmon, and Central Valley steelhead.

VIII. INCIDENTAL TAKE STATEMENT

Section 9 of the ESA and Federal regulations pursuant to section 4(d) of the Act prohibit the take of endangered and threatened species, respectively, without special exemption. Take is defined as to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct. Harm is further defined to include significant habitat modification or degradation that results in death or injury to listed species by significantly impairing essential behavioral patterns, including breeding, feeding, or sheltering. Incidental take is defined as take that is incidental to, and not the purpose of, the carrying out of an otherwise lawful activity. Under the terms of section 7(b)(4) and 7(o)(2), taking that is incidental to and not intended as part of the proposed action is not considered to be prohibited taking under the Act provided that such taking is in compliance with this Incidental Take Statement.

Under the terms of section 7(b)(4) and 7(o)(2), taking that is incidental to and not intended as part of the proposed action is not considered to be prohibited taking under the Act provided that such taking is in compliance with this Incidental Take Statement. The issuance of Permit 1431 authorizes intentional take of Central Valley spring-run Chinook salmon, and Central Valley steelhead associated with DWR's proposed research activities. The action of issuing Permit 1431 does not anticipate incidental take of endangered or threatened species. This opinion does not authorize any taking of a listed species under section 10(a) or immunize any actions from the prohibitions of section 9(a) of the ESA.

IX. REINITIATION OF CONSULTATION

This concludes formal consultation on the issuance of Permit 1431. As provided in 50 CFR § 402.16, reinitiation of formal consultation is required where discretionary Federal agency involvement or control over the action has been retained (or is authorized by law) and if: (1) the amount or extent of incidental take is exceeded, (2) new information reveals effects of the action that may affect listed species or critical habitat in a manner or to an extent not previously

considered, (3) the identified action is subsequently modified in a manner that causes an effect to listed species or critical habitat that was not considered in this amendment to the Central Valley Research Opinion, or (4) a new species is listed or critical habitat designated that may be affected by the identified action.

XI. LITERATURE CITED

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Table 1.- Anticipated annual take of Central Valley spring-run Chinook salmon and steelhead

Study Element	Affected ESU	Life Stage	Non-lethal Take	Lethal Take	Take Activity	Date	Comments
Spring-run Chinook salmon Holding and Spawning Status	Central Valley Spring-run Chinook salmon	Adult	50	5	Capture, radio, tag, release	April - Oct	Capture by angling or fyke trap. Lethal take is unitentional.
Chinook Salmon Spawning Escapement	Central Valley Spring-run Chinook salmon	Adult	40,000 25,000=female 15,000=male	N/A - Fish collected are already dead	Count, mark, recapture. Scale, otolith, and tissue collection	Sep - Dec	No distinction possible between fall- and spring-run Chinook salmon. Scale, otolith, and tissue samples will be taken from 500 of these fish (300 females, 200 males)
Growth, Movement, and Life History of Steelhead Trout	Central Valley Steelhead	Adult	100	5	Scale collection	Oct - May	Capture by volunteer anglers. Lethal take is unitentional.
Growth, Movement, and Life History of Steelhead Trout	Central Valley Steelhead	Adult	10	N/A - Fish collected are already dead	Otolith collection	Oct - May	Carcass recovery
Growth, Movement, and Life History of Steelhead Trout	Central Valley Steelhead	Juvenile	750	25	Capture, tag, release	June - Aug	Electrofishing and seining for growth, survival, movement. Lethal take is unitentional.

resulting from the Lower Feather River Fishery Studies.